



5.13A Structure and Function



Organisms & Environments Strand

Analyze the structures and functions of different species to identify how organisms survive in the same environment.



Overview

Digital Student Journal

Central Concepts

- Different structures in various plants and animals allow them to function and survive in their environment, such as cones vs. flowers on trees or the shapes of beaks and feet on birds.
- Physical characteristics allow for organisms to respond to interactions in their environment to escape predation, camouflage through seasons, and promote pollination.
- Comparing structures and functions of species in various environmental models promotes explanations on how organisms survive in their ecosystem.

Misconceptions

- Students often confuse structure and function in living things.
- Structures that help animals survive do not appear in one generation. Students often think these changes occur quickly. It takes generations for living things to adapt to their environment.

Segment Title & Activities Description

- **Recall**

Review: What is Structure vs. Function?

Students recall prior knowledge of the structures and functions of organisms and how they contribute to survival.

- **Practice A**

Investigation: Pollination in Texas

Students collect and analyze data in a simulated comparative investigation to answer the research question, "How does sunlight and water affect plant growth? can explain how structures on plants help them survive?"

- **Practice B**

In the Field: EJ the Naturalist

Students actively read and reflect as field scientists, support a second hand field investigation with EJ the Naturalist, and identify the necessary components to an educational poster.

- **Apply**

Mission: 21st Century Biomimicry

Students embark on a real-world scenario with a mission to design an efficient flashlight based on the principles of biomimicry and the bioluminescence of firefly species in Texas.

Integrated Standards Alignment

All standards are based on Texas Essential Knowledge & Skills statements unless otherwise noted.

Looking Behind: Grades 3 and 4

- Science
 - 3.13A Explore and explain how external structures and functions of animals such as the neck of a giraffe or webbed feet on a duck enable them to survive in their environment.
 - 4.13A Explore and explain how structures and functions of plants such as waxy leaves and deep roots enable them to survive in their environment.

Looking Ahead: Middle School

- Science
 - 6.13B Identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic; and
 - 6.13C Describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.
 - 7.13B Describe the hierarchical organization of cells, tissues, organs, and organ systems within plants and animals.
 - 7.13C Compare the results of asexual and sexual reproduction of plants and animals in relation to the diversity of offspring and the changes in the population over time.
 - 8.13C Describe how variations of traits within a population lead to structural, behavioral, and physiological adaptations that influence the likelihood of survival and reproductive success of a species over generations.

Recall

- ELAR 5.6E (Comprehension Skills)
Make connections to personal experiences, ideas in other texts, and society.

Practice A

- Scientific and Engineering Practices
 - 5.1F Construct appropriate graphic organizers used to collect data, including tables, bar graphs, line graphs, tree maps, concept maps, Venn diagrams, flow charts or sequence maps, and input-output tables that show cause and effect.
- Math
 - 5.1D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
 - 5.9A represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots
 - 5.9B represent discrete paired data on a scatterplot

Practice B

- Scientific and Engineering Practices
 - 5.4B Research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.
- Recurring Themes & Concepts
 - 5.5F Explain the relationship between the structure and function of objects, organisms, and systems.
- Reading Language Arts (RLA)
 - 5.3B Use context within and beyond a sentence to determine the relevant meaning of unfamiliar words or multiple-meaning words (R).
 - 5.6F Make inferences and use evidence to support understanding.
 - 5.7B Write responses that demonstrate understanding of texts, including comparing and contrasting ideas across a variety of sources.

Apply

- Scientific and Engineering Practices
 - 5.1B Use scientific practices to plan and conduct descriptive and simple experimental investigations and use engineering practices to design solutions to problems.
 - 5.1G Develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem.
 - 5.2D Evaluate experimental and engineering designs.
- Reading Language Arts (RLA)
 - 5.3B Use context within and beyond a sentence to determine the relevant meaning of unfamiliar words or multiple-meaning words.
 - 5.7F Respond using newly acquired vocabulary as appropriate
 - 5.9E Recognize characteristics and structures or argumentative text, identifying the claim.

English Language Proficiency Standards (ELPS)

Emergent bilingual students may come from diverse linguistic and cultural backgrounds, and may have varying levels of proficiency in English. The English Language Proficiency Standards (ELPS) provide a framework that is designed to support emergent bilingual students in developing their English language skills while learning academic content across four domains of language development: listening, speaking, reading, and writing. Helpful literacy tasks to support all levels of language acquisition proficiency are included in each segment of this TREK.

General tips for working with emergent bilingual students are provided below.

Listening

- Provide real-life examples: Use examples from the students' own experiences to help them connect the concepts to their own lives.
- Ask clarifying questions: Encourage students to seek clarification from their peers or teacher on confusing concepts or instructions.
- Assess Listening Comprehension: Provide multiple modes of opportunity for students to demonstrate listening comprehension including responding to questions, collaborating with peers, and taking notes.

Speaking

- Use routine language: Repeat key vocabulary and phrases multiple times throughout the lesson to reinforce the routine use of complete sentences.
- Allow for group work: Encourage students to work in small groups to reinforce the concepts and vocabulary.
- Assess speaking: Monitor students as they demonstrate their speaking skills through retelling, giving information, and asking for information.

Reading

- Use visual aids: Use images, diagrams, and videos to help students better understand the concepts being taught.
- Use graphic organizers: Use graphic organizers, such as Venn diagrams or concept maps, to help students see the relationships between the basic needs of producers and consumers
- Incorporate hands-on activities: Incorporate hands-on activities, such as sorting and categorizing basic needs, to help students better understand and remember the concepts.
- Use gestures and movements: Encourage students to use gestures and movements to help reinforce the vocabulary they are learning and ask for help from peers and teachers.

Writing

- Use sentence frames: Use sentence frames to help students express their ideas and thoughts in English. This can help them feel more confident and participate more actively in writing assignments.

Learning Strategies

- Provide positive reinforcement: Provide positive reinforcement and praise for student efforts and progress in understanding the concepts.
- Allow for individual practice: Provide opportunities for individual practice, such as matching definitions with vocabulary words or creating their own examples.
- Monitor understanding: Regularly check in with students to assess their understanding of the concepts and vocabulary being taught.

See individual ELPS strategies and tips in each segment's Teacher Instructions. They are provided in yellow "spotlight" boxes for easy recognition. The one provided below is universal for every TREK, but is specific to the TEKS standard addressed.

Helpful Sentence Frames for Beginning and Intermediate Emergent Bilingual Students

Past Tense

- I observed how pollinators...
- When I/we collected data, I/we found that we...
- One observation I made about the structure of plants and animals was...

Present Tense

- I have a question about how organisms survive...
- The difference between structure and function is...
- One way the structure helps an animal survive is...

Future Tense

- I will need to ...
- If I were to complete this experiment in a real lab setting, I would...
- We have to observe...

Probing Questions

- What is the relationship between structure and function?
- How does the data indicate a change?
- How does your research reflect an answer to the question?